

THE KOGO STRUCTURE (EQUATORIAL GUINEA) AS A POSSIBLE SOURCE CRATER FOR THE ORIGIN OF CARBONADO DIAMONDS FROM BRAZIL AND THE CENTRAL AFRICAN REPUBLIC. S. Master, Department of Earth and Planetary Sciences, Harvard University, Cambridge MA, USA, Permanent Address: Department of Geology, University Witwatersrand, Wits 2050, South Africa, (065sha@cosmos.wits.ac.za).

Carbonados are porous polycrystalline diamond aggregates, with highly polished ceramic-like surfaces, that are found in diamondiferous placer deposits in Bahia (Brazil), and in two areas (Carnot-Berberati and Ouadda-N'dele) in the Central African Republic (CAR)[1,2]. Other polycrystalline forms of diamond, called framesites and yakutites, can be distinguished morphologically and isotopically from carbonado [3]. It has been suggested that carbonados, which have typical crustal mineral associations, and which have not been found in kimberlites, may have originated from large meteorite impacts in earth's early history [4]. Girdler et al. [5] regarded the large Bangui magnetic anomaly to be of impact origin, related to a 900-km circular feature interpreted from a digital elevation model to be an impact structure, and they attributed the origin of CAR carbonado to this postulated impact. Shelkov et al. [6] argued that the proximity of the pre-drift positions of the Brazilian and CAR carbonado localities, together with the close similarities of carbonados from both areas in terms of $\delta^{13}\text{C}$ and $\delta^{14}\text{N}$, supported a common origin for carbonado through impact processes related to the Bangui structure. After the discovery of highly reduced phases and native metals, such as SiC, Si, Ti, Fe-Cr, Ni and Ag in carbonados [7,8], it has been suggested that carbonados may be meteoritic, and of extra-terrestrial solar or pre-solar origin [9].

A re-examination of the geology of the CAR carbonado localities [1] shows that it is impossible for them to be related to the Bangui structure, since the carbonados are found in the Cretaceous Carnot Formation, in two outliers 600 km apart, both of which are wholly or partly within the 900-km "Bangui Structure" of [5]. If carbonados were of impact origin, they would be ejected outwards from a large impact crater, and would not be found in fluvial deposits within such a crater. Furthermore, the Bangui magnetic anomaly is not confined to the circular feature, but extends for at least 2000 km to the Atlantic coast, parallel to an adjacent magnetic anomaly that coincides with the hot-spot track of the Cameroon Volcanic Line [10]. Circular structures such as those recognised by [5] can also be generated from arbitrary random data sets

[11], and don't have any geological significance. So if the Bangui anomaly is not of impact origin (and there is no evidence of associated shock metamorphism), then where do the Brazilian-Central African carbonados come from, if they are related to impact processes?

A new possible impact crater, the 4.67 km diameter Kogo Structure, has been discovered in satellite radar imagery of the tropical rain forest of Equatorial Guinea [12]. The Kogo Structure, located at 1°11'N, 10°1'E, is situated on Precambrian gneisses, and is partly faulted away on its western side by Neocomian faults related to the Atlantic opening, and is thus older than 145 Ma [12]. Using a pre-drift reconstruction of Gondwana, the Kogo structure is situated exactly between the Brazilian and CAR carbonado localities. There is a systematic decrease in abundance and maximum size of carbonados [1] with distance away from the Kogo Structure, which is proposed as the source crater for impactogenic (or meteoritic) carbonados of Bahia and the Central African Republic:-

Carbonado Locality	Distance from Kogo Structure	Maximum size of carbonado
Bahia, Brazil	570 km	3167 ct
Carnot-Berberati	750 km	740 ct
Ouadda-N'dele	1350 km	"very small"

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